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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,753	09/10/2003	Jiro Yuzawa	00597/0200038-US0	3476

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EXAMINER

LEUNG, RICHARD L

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,753

Applicant(s)

YUZAWA, JIRO

Examiner

Richard L Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-4 is/are rejected.
- 7) ☒ Claim(s) 2 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the recitations of "the compressor (3)" on page5, lines 21 and 23 are presumed to be --the condenser (3)--. Appropriate correction is required.

Claim Objections

2. Claim 5 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Claim 5 depends from claims 2 or 4. However, claim 4 is a multiple dependent claim that depends from claims 2 or 3. Accordingly, claim 5 has not been further treated on the merits.

3. Claim 2 is objected to because of the following informalities: the recitation of "a refrigerant composition comprising R245fa, R125, R508A or R508B and R14" is somewhat unclear. In light of the specification, the claim is interpreted to mean a composition comprising R245fa, R125, R14, and one of either R508A or R508B, and the claim shall be treated as such for the remainder of this action. Appropriate correction is required. Insertion of a comma "," immediately following the phrase, "R508A (R23/R116:39/61) or R508B (R23/R116:46/54)" would be one way to overcome this objection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Singh et al. (WO 02/26913 A2). Singh et al. disclose a multi-component fluorocarbon refrigerant comprising a plurality of known refrigerants, as stated on lines 5-9 on page 11. The combination of refrigerants may include R245fa (under *Propane Series* of Table I), R125 (under *Ethane Series* of Table I), R14 (under *Methane Series* of Table I), and either R508A or R508B (under *Azeotropes* of Table III), as required by the claim 2.
6. Claim 4 adds the limitation of including with the above refrigerant combination, n-pentane at 0.1 to 12 wt%. Singh et al. disclose the further addition of a solubilizing agent, which is at about 0.1 to about 20 wt% but preferably at about 0.1 to about 10 wt% of the composition (page 7, lines 3-6). It is also disclosed that the solubilizing agent can be pentane (under *Hydrocarbons* of Table II), which is merely a synonym of n-pentane. Accordingly, the requirements of claim 4 are also met.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al. (WO 02/26913 A2). Alternatively, if one did not agree that Singh et al. teach the claimed composition with "sufficient specificity" to be considered anticipation, it

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would have been *prima facie* obvious to use the claimed refrigerants in combination as one would be merely choosing all known refrigerants from the Tables given by Singh et al. in accordance with the explicit instructions to do so on page 11, lines 5-9. Where claimed composition components lie inside the broader list of components already disclosed (by Singh et al.), a *prima facie* case of obviousness exists. See MPEP § 2144.05.

9. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuzawa (EP 1 136 540 A1) in view of Singh et al. (WO 02/26913 A2) and Lund et al. (US-5866029). Yuzawa discloses a non-azeotropic mixture refrigerant for use in a refrigerant circuit comprising a condenser 3, an evaporator 17, a compressor 1, and heat exchangers 8, 13, and 15, and gas-liquid separators 5 and 10 disposed in a multi-stage manner. The refrigerant mixture comprises R600 at 28.6 to 42.9 wt%, R125 at 10.7 to 28.6 wt%, R508A at 14.3 to 28.6 wt%, and R14 at 19.6 to 46.4 wt%. It was also disclosed that R508A could be replaced with R508B (column 5, lines 5-7). Yuzawa, however, fails to include R245fa in the mixture as required by the claims. Singh et al. teaches the combining of a plurality of known refrigerants to form a multi-component refrigerant (page 11, lines 5-9) comprising R245fa (under *Propane Series* of Table I), R125 (under *Ethane Series* of Table I), R508A or R508B (under *Azeotropes* of Table III), and R14 (under *Methane Series* of Table I). It would have been obvious to one of ordinary skill in the art to include R245fa in the composition disclosed by Yuzawa because it is a well known refrigerant which can be used in combination with other refrigerants as taught by Singh et al. to form different multi-component refrigerants.

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More specifically, it would have been obvious to one of ordinary skill in the art to replace R600 in the refrigerant mix disclosed by Yuzawa with R245fa because it is known in the art that R245fa is significantly less flammable than R600 (butane) or other hydrocarbons as evidenced by Lund et al. (US-5866029) on column 3, lines 21-24 and would therefore create a safer composition.

10. Claim 4, however, requires the addition of n-pentane at 0.1 to 12 wt% which is not disclosed by Yuzawa. Singh et al., in addition to the combination of R245fa, R125, R508A or R508B, and R14, teach the use of pentane in the refrigerant mixture under *Hydrocarbons* of Table II for use as a solubilizing agent, preferably at about 0.1 to about 10 wt% (page 7, lines 3-6). It is known in the art that pentane is merely a synonym of n-pentane. It would have been obvious to one of ordinary skill in the art to further include n-pentane at 0.1 to 12 wt% in the mixture disclosed by Yuzawa in order to dissolve lubricating oil in the refrigeration circuit so that it can be transported back to the compressor, as taught by Singh et al. on page 7, lines 1-6. Consequently, the combination of Yuzawa and Singh et al. meets the limitations set forth by claim 4.

Response to Arguments

11. Applicant's arguments with respect to claims 2-4 have been considered but are not persuasive in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-4622825 Larue et al. 11-18-1986: discloses a cold generating circuit comprising heat exchangers, vapor/fluid separators, condenser and evaporator,

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which uses as a working fluid a multi-component mixture that may contain n-pentane, pentafluoroethane, pentafluoropropane, tetrafluoromethane, trifluoromethane, and hexafluoroethane.


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 703-306-4154. The examiner can normally be reached on Mon-Fri.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise L. Esquivel can be reached on 703-308-2597. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744

rl


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